



Série Documentos de Trabalho

Working Papers Series

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DT/WP nº 58

ISSN 2183-1785

Instituto Superior de Economia e Gestão
Universidade de Lisboa
Lisboa – 2016

The chronic food deficit of early modern Portugal: curse or myth?

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Abstract

Two historiographical currents have debated whether early modern Portugal was cursed by an excessive dependence on foreign food imports as a result of being unable to feed its population, or not. In this short paper, the first long-run systematic quantitative study of this question, we show that the former view is a myth and therefore could not be a curse. Throughout the entire period, a certain amount of grain was in fact imported but cereal purchases abroad never represented more than a diminutive percentage of total food consumption. More importantly, the country carried out a diversified trade in foodstuffs which was seldom seriously out of balance. Portuguese agriculture showed itself consistently capable of specializing in different foodstuffs for export. It was thus not hopelessly inefficient and succeeded reasonably well in meeting the basic nutritional needs of the population.¹

[This version: March 2, 2016]

JEL classifications: N53; O49

Key-words: Food deficit; Agriculture; Foreign trade; Portugal

¹ The results of this paper reinforce recent perspectives on the long term agricultural development of early modern Portuguese agriculture. See Serrão (2016) and Reis (2016).

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1. The problem

The need to produce reliable estimates of the exports and imports of the main foodstuffs in Portugal during the interval 1550-1850 arises from two circumstances. Firstly, it serves to verify whether food output and consumption were roughly equal, as is now being claimed for other early modern economies. The relevance of this arises when trying to estimate agricultural output indirectly by using a food demand function and assuming this equality.² In the specific case of Portugal, a second reason for this concern is the strongly held view that for centuries the country suffered from a pronounced food deficit owing to its inability to meet the dietary requirements of its population. A popular topic since the early fifteen hundreds, this issue has been taken up in every century thereafter by the numerous writers and historians who have pondered the causes of the country's alleged decline and stressed the chronic need to import cereals as a symptom of this economic failure (Leão ([1610] 2002; Faria([1655] 2003; Sérgio 1984).

More recently, doubts have arisen, however, as to the significance of this relationship. Silbert (1978) has suggested that after all Portugal was not as reliant on imported grain as had been previously thought. Serrão (2005; 2016), following this intuition, has established, with considerably greater accuracy, that in the period 1776-1795 national cereal dependence represented less than 10 percent of consumption and was therefore 'not a dramatic problem'.³ None of these studies, however, has met two essential conditions for achieving a complete clarification of the issue. One is the need for a multi-secular perspective when dealing with a 'structural' question. The other is the failure to consider the topic of grain scarcity in the broader framework of agricultural supply as a whole. Our aim here is to present a study which includes these dimensions in the analysis.

Owing to the scarcity of data, continuous time-series are out of the question and we have had to constitute, as the basis for this exploration, a set of seven benchmarks placed at fifty year intervals, from 1550 to 1850. For each one, we have gathered the available information concerning the international trade in the products of agriculture which were both consumed at home and imported or exported to a significant extent. This enables us to calculate, for each benchmark and for each commodity, the country's external surplus or deficit at current prices. By aggregating these results and comparing the figures obtained with estimates for total agricultural consumption, we are able to obtain the ratio of domestic agricultural production to consumption for every benchmark and, thus, achieve the long-run, full-cover perspective which is the object of the present exercise.

² The studies which launched this approach are Wrigley (1985) and Allen (2000).

³ Serrão (2016 forthcoming). A more detailed treatment of this argument can be found in Serrão (2005).

Inevitably, this effort is not exempt from shortcomings. Portuguese early modern foreign trade data are sparse and not wholly reliable, and those we are able to obtain do not always coincide with our benchmark years. Until the late eighteenth century, there are no Portuguese official trade statistics. Moreover, the earlier sources at our disposal form a disparate and not always congruous collection made up of official reports, accounts by travellers and consuls, petitions and remonstrances to the authorities. To these we can add the foreign trade statistics of Portugal's principal commercial partners. In view of this and for the sake of simplicity, we have chosen to focus on only the three most important items which fit the requirements of this study - grain, wine and olive oil. Other commodities, such as almonds, figs, wool, fresh fruit, cork and hides are ignored, given their lesser economic importance and weaker representation in our sources throughout the period considered.

All things considered, we believe that the present analysis is not without utility. Not only is it the first one to permit a different answer to the centuries-old question of Portugal's external food dependency. It also contributes towards elucidating the relative importance of international food balances in the economic history of Europe generally and, in particular, their role in the emergence of the early modern era in this region.

2. Context and motivation

The historiographical origins of the topic addressed in this paper lie in the expansion since the sixteenth century of the trans-European bulk commodity trade and of the shipping which carried it. This was fully addressed by Braudel in his 1949 pioneering work 'The Mediterranean and the Mediterranean World at the Time of Philip II'. In it he showed the centrality, in this process, of the growing economic complementarity between northern Europe and the regions bordering on the Mediterranean. This was the theme which World-Systems Analysis was to bring up again some time later (Mauro 1961; Wallerstein 1976) when it stressed similar foundations for a gradual but irreversible reallocation of the capitalist centers of the Western World from the Italian to the North Atlantic states, first the Dutch Provinces in the 17th century and Britain thereafter.

The ultimate explanation for the start of this long-term shift in economic geography lay in the crisis of the 14th century. The recovery from the Black Death brought about changes in factor allocation which caused a new and broader division of labour within the European continent. Based on the reinforcement of serfdom, central European areas entered into a large scale production of cereals, while demographic recovery in the southern areas brought about decreasing returns in agriculture. Regular imports of foodstuffs to feed urban centers thus became structural. The dependence of semi-peripheral economies on grain from central

Europe stimulated the competitive development of shipping and financial services provided by the powers which eventually would become the core regions of the system.

In Portugal, a similar debate to this one has held the intellectual stage for almost as long. From early on, Portuguese researchers kept up with these historiographic developments and sought to fit the country's past into the same scheme of ideas. The notion that primary products were essential to the country's supra-national economic integration was soon adopted by Virginia Rau (1950, 1951), a pioneer in this field. Her study of the salt trade and foreign shipping in Portuguese ports showed the considerable weight of Portugal's regular importation of grain. By the 17th century all of this was becoming a part of a wide and complex web of maritime routes, which via the Sound linked shipping from the Baltic with the west coast of Portugal and back. In her analysis, the predominance of primary products in Portugal's intra-European trade reflected the inefficiency of a major sector - grain - but also, paradoxically, the considerable efficiency of another primary sector – salt extraction – which supplied competitively an immense market stretching from the Low Countries through to Scandinavia.

The two other giants of Portuguese economic historiography in this epoch followed in Rau's steps, though with two significant modifications. In the mid-1950s, Godinho (1955) proposed an approach which downplayed Portugal's 'salt connection' as a significant determinant of the pattern of the country's foreign trade. Instead, he focused on the grain deficit as '*une des constantes les plus indiscutables et plus importantes de l'histoire économique portugaise*' and reinforced this by shifting the locus of the problem deeply into the middle ages, as far back as the 13th century. Later Oliveira Marques (1968), returned to the theme, with similar claims. The medieval roots of grain insufficiency were reaffirmed but it was in the early modern period that the necessity for wheat imports became 'chronic' and a 'normal' part of life.

A recent international literature has challenged several aspects of the legacy of the World-Systems Analysis. This includes downplaying the importance of the sea-borne trade in foodstuffs among nations. The grounds for the latter claim are that in the early modern era the production of agricultural goods tended to equal their consumption (Allen 2000). Initially, this was proposed as an assumption, with Britain and the Netherlands as two exceptional cases for which there was empirical support. In the Netherlands, the most open of these economies, the ratio of agricultural imports to production was quantified at almost 10 per cent on either side of the point of equilibrium. In Britain, this was close to 5 per cent (Allen 2000: 14). More recently, new research has further supported this view. For Spain, the ratio has been estimated at around 10 per cent in the late 18th century, a 'small share of

agricultural output' (Alvarez-Nogal and Prados de la Escosura 2007: 344). For Germany, between 1500 and 1850, it oscillated between 0.9 and 3.6 per cent (Pfister 2008: 23).⁴

In contrast, Portuguese historiography has not reconsidered the question of Portugal's dependence on food imports in light of these revisions. The closest it has come to this are Serrão's recent studies (2005 and 2016) which focus on Portugal's grain importation as a percentage of the domestic output of this commodity, but they are confined to one century only - the seventeen hundreds. In the present study, we go further and assess the significance of all major foodstuffs in the broader framework of total agricultural supply and report this for an interval of three and a half centuries.

3. The method

Table 1 displays the results of our estimation, while the appendix at the end of the paper provides information on the sources and how the data from them were processed. For each benchmark, we calculate the annual values at current prices of the exports or imports of the agricultural items we are considering, expressed in tons of silver (cols. 1, 2 and 3, respectively for wine, olive oil and grain). Depending on the years, these may be either available directly from the sources or obtained by multiplying volumes (when provided by the sources) by their respective market prices in Lisbon. They are added up to give us the net aggregate value of foreign transactions in food for each benchmark, again in tons of silver, as shown in col. 4.

In the present state of research, statistics for national agricultural consumption at current prices are unobtainable. The next best solution is to use a short-cut method proposed by Malanima (2011: 179). The first step in this requires that we calculate the total income of all production factors together (land, labour and capital). This is done by multiplying the yearly total wage bill in tons of silver by a factor of 1.4 based on the assumption that earnings from capital and land jointly represent 30 per cent of national income.⁵ An additional supposition required by this procedure is that the average propensity of early modern European populations to consume food is equal to 0.6. We therefore use this coefficient to arrive at the figure representing the total expenditure on food by all those in receipt of national income, also in silver, i.e. by multiplying national income by 0.6. The result is displayed in col. 5 and serves to determine the ratio of the food trade surplus/deficit relative to food consumption in col. 6.

⁴ For Italy, as yet there is no evidence but Malanima (2011) has accepted the assumption of equality between consumption and output as good.

⁵ For a detailed account of how the annual wage bill is estimated and then converted to national income, respectively for Portugal and Italy, see Reis (2016) and Malanima (2011).

4. Results and conclusions

The results displayed in table 1 point to five conclusions regarding the integration of Portugal's early modern agriculture into the international economy.

Table 1
Portugal external food balance, 1550-1850

Year	Wine exports	Olive oil exports	Grain imports	External food balance	Total food consumption	External food balance/ total food consumption (per cent)	Grain import/Total food consumption (per cent)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1550	0	0,6	-16,8	-16,2	916	-1,8	-1,8
1600	1,9	3,6	-25	-19,5	1965	-1,0	-1,3
1650	3,9	6,5	-14,9	-4,5	1961	-0,2	-0,8
1700	18,2	21,4	-14,4	25,2	1858	1,4	-0,8
1750	20,4	6,1	-23	3,5	2311	0,2	-1,0
1800	128,5	8,3	-151,6	-14,8	3360	-0,4	-4,5
1850	115,2	10,3	-10	115,5	3742	3,1	-0,3
total	288,1	56,8	-255,7	89,2			

Notes: col. 4 = col.1+ col.2+col.3; col.6 = col.4/ col.5; col.7= col.3/ col. 5.

Units: cols 1, 2, 3, 4 and 5, tons of silver; cols. 6 and 7, percent.

Sources: see appendix.

The first confirms that the country's net cereal importation (col. 3), as has been so often claimed, was a permanent feature of economic life from the sixteenth to the nineteenth centuries. Moreover, it shows that in absolute terms this flow was not insignificant and played a non-trivial role in feeding the population, particularly that of the major cities along the coast (Serrão 2016). For the rest of the country, however, where most of the Portuguese lived, its relevance was modest from this point of view. The ratio of imported grain to national food consumption (col. 7) never exceeded 5 per cent and most of the time was below the 2 per cent mark. Any counterfactual suggestion that without wheat imports the country would have starved seems difficult to uphold.

Our second finding is reached by broadening the context and considering together all the major internationally traded foodstuffs, i.e. those that were imported (grain and flour) and

those that were the object of exportation (wine and olive oil). The picture now changes, in the same direction but in a more pronounced fashion. Over the long run, net external food trade balances (col. 4) were more often surpluses than deficits and, in the three centuries considered, the result is positive with regard to the early modern period as a whole.

The third outcome of this study is that it casts doubt on the presumed equivalence between Portugal's external grain dependence and the ineffectiveness of its agriculture. On the basis of the data compiled, Portuguese dependence on imports of cereals may arguably be seen, not as a problem of inefficiency of its agriculture. Instead it reflected its capacity to diversify, specialize and achieve levels of productivity enabling it to export sectoral surpluses to other economies. In addition, it signals a reasonable ability to adjust to shifting patterns in international demand, exemplified by primacy going to olive oil in the 16th and 17th centuries and wine in the 18th and 19th centuries.⁶

The fourth conclusion is that the numbers collated here sit awkwardly with the Modern-World System analysis of the role of North-South trade in the decline of the countries of the south during the period considered. The scale of the grain flows to Portugal from the Baltic and of the shipping they required was too small, macro-economically, to account plausibly for the economic backwardness which supposedly cursed this 'semi-peripheral nation' during the 16th, 17th and 18th centuries⁷.

A final implication of our exercise is of a practical nature. Modern estimates of gross agricultural product which use a demand-for-food function and assume that the output and consumption of agricultural products are roughly equal can be accepted with reasonable confidence in the Portuguese case too.

In sum, the chronic grain deficit of early modern Portugal, although clearly a part of historical reality was far from having the economic impact which conventional wisdom has attributed to it. It was neither a myth nor a curse.

⁶ It should be noted that the bulk of agricultural exports was sold to European markets, not to highly protected colonial ones.

⁷ Research by Costa, Palma and Reis (2015) questions the "curse" of economic backwardness often espoused in the Portuguese economic history literature.

A1. 1550

Agricultural exports from Portugal during the sixteenth century were small compared to re-exports from the empire, and went mainly to northern Europe via Antwerp. Total agricultural exports at current prices for the years 1535-7 amounted to 8.2 million reais⁹ or, 0.68 tons of silver (Costa et al, 2016, forthcoming). In the absence of data for 1550, they are the ones we are going to use for this benchmark.

Wine exports, later a key item in Portuguese foreign trade, was an insignificant part of this and amounted to a mere 18,425 litres inferred from total values of exports and current prices.

The remainder was mostly olive oil worth 0.60 tons of silver.¹⁰ For want of a better solution, we have assigned these data to our 1550 benchmark.

Grain imports during the sixteenth century are also shrouded in mystery despite frequent references by foreign and national observers to their substantial scale and the concern of rulers to ensure that adequate supplies, particularly for Lisbon and lesser cities, were assured. Rebelo da Silva cited by Godinho (1965: 279, vol. II), claimed that between 1525 and 1562 yearly grain imports cost on average 500,000 cruzados or 16.8 tons of silver.¹¹ This result is preferred to Godinho's (1955: 147) other estimate of 100,000 moios a year (equivalent to 828,000 hectolitres) of grain for circa 1550 for which the empirical support is weak.¹²

A2. 1600

Given the absence of agricultural export figures for olive oil and wine exports for this benchmark, we have interpolated them from two other benchmarks for which evidence exists, namely 1550 and 1650.

⁸ All volumes are expressed in metric litres. Total values of exports and imports are expressed in tons of silver.

⁹ The real was the basic monetary unit for Portugal since 1430. In this year, the content of one real in silver was 0.255 grams but by the mid seventeenth century this had fallen to about 0.05 grams.

¹⁰ All valuations are carried out using current prices from the "Prices, Wages and Rents" (PWR) database: <http://pwr-portugal.ics.ul.pt/>. Olive oil was 88 percent of the total export value, and figs, the next largest item, 7 percent. (Costa et al 2016: forthcoming).

¹¹ This is the equivalent to 200 million reais. At current prices this would have represented a volume of 36.2 million litres of wheat.

¹² One *moio* equalled 60 *alqueires*. We have converted the latter to the metric system at a rate of 13.8 litres per *alqueire* since this was the measure in Lisbon, Portugal's principal port. Godinho's first reference to this figure, in 1955, was taken from Barros (1941: 115). The latter, however, was a citation of a mid-seventeenth century document produced by Lisbon's municipality which has never been traced.

For wine, by this method, we obtain a volume of 0.22 million litres worth 1.9 tons of silver at current prices.

For olive oil and using the same procedure, we have inferred a volume of 3.6 tons of silver.

For grain and again for lack of better alternatives, we have taken the mean of the import volumes of grain in 1550 and 1650, i.e. 25.0 million litres, and multiplied it by the current price of 1.0 grams of silver per litre. The result is 25.0 tons of silver.

A3. 1650

Direct evidence for wine and olive oil exports for this benchmark is non-existent and we have to make do with the best inferences we can manage. For wine, the closest we get are the data provided by Shillington and Chapman (1907: appendix II) for Portuguese wine exports to Britain, Portugal's main client for this commodity. In the period 1675-1679, this represented an annual average volume of 2.8 million litres which, at 1650 prices, would have been valued at 3.9 tons of silver. For olive oil, we base our estimate on British imports from Iberia through London in 1663-9 which were worth £131,000. We assume, with Davis (1962), that 40 per cent were from Portugal. At an exchange rate of £0.42 = 1,000 reais and an equivalence of 19 reais to one gram of silver, this would amount to a total value of 6.5 tons of silver.

According to trade figures inferred from Rau's (1954) seventeenth century shipping estimates, we calculate that during the period 1641-1649 the yearly average number of ships landing grain in Lisbon was twenty one. Since their mean load was an average of 300 shipping tons, this would imply an entry at this point of 10.4 million litres. For the entire country, an adjustment must be made that raises this to 14.9 million litres.¹³ At current prices, this represents a value of 14.9 tons of silver, the figure we accept for 1650. This result is corroborated by an independent source - an estimate by the *juiz do povo* of Lisbon in 1632 (Godinho 1965: 280) – who also estimated the value of grain imports at 14.9 tons of silver in that year.

A.4 1700

Data for wine exports at this date are available only for shipments sent to Britain. Since this country was then the overwhelming purchaser of this article from Portugal (more than 90 percent according to Martins (1990: 48)), we consider these data as representative of the entire trade. According to Martins (1990: 79), in the period 1700-1704 the average yearly volume was 7.2 million litres, which at current prices would have fetched a total value of 18.2

¹³ According to Rau (1954: 256-257), 77% of the total import of grain went through Lisbon. The remainder was processed by lesser ports and Porto.

tons of silver.¹⁴ Significantly, similar values – 7.2 million litres and 11.5 tons of silver - are reported by Fisher (1981).

Thanks to Costa et al. (2016 forthcoming) we are able to estimate the foreign sales of Portuguese olive oil shipped from Lisbon and Porto. In total this amounted to 7.1 million litres in 1690, the closest available year to 1700 and consequently the one we adopt. Their total worth was 21.4 tons in silver.

Quantitative information on grain imports at this time is unobtainable but Britain's commercial predominance in this trade too - more as an intermediary than as a supplier of its own produce - justifies using its sales to Portugal as a proxy for total imports. We draw on evidence from four sources which provide data from both sides of 1700, namely Fisher (1984) and Francis (1960) for post-1700, and Hanson (1981) and Rau (1954) for pre-1700. The mean of their respective volumes is 18 million litres a year and were worth 14.4 tons of silver at current prices.¹⁵

A.5 1750

As in the preceding section (A.4), wine exports are obtained in volume from Martins (1990) and come to 14.8 million litres. Only the price of port wine was employed this time to value them given that by then this beverage represented around 90 per cent of all wine exports. The total value of this item amounted to 20.4 tons of silver.

As no data are obtainable for the export of olive oil for this benchmark, we use the closest evidence available on volume and price, which is for 1776. This is the year of publication of the first *Balança Comercial da Nação Portuguesa*, an official annual compilation in manuscript form of Portugal's foreign trade statistics.¹⁶ The figure it provides us with is a total shipment in volume terms of 2.5 million litres and, at 1750 prices, a market value of 6.1 tons of silver.

In the absence of direct information on the consumption of foreign grain, we have adopted the mean of the years 1729 and 1776, taken, respectively, from Godinho (1955: 148) and the *Balança Commercial* for 1776. The results are a total volume of 37.1 million litres and a total value of 23.0 tons of silver, the latter using 1750 Lisbon prices.

¹⁴ In this case the price employed is a composite of the prices, respectively, of ordinary wine in Lisbon and the price of port in Porto, their proportions then being 49 and 51 percent (Martins 1990: 254).

¹⁵ Data from Fisher (1984) is for wheat only, while that from Francis (1960) is for all types of grain. Both of them correspond to sales in all Portuguese ports. According to Francis (1960), Portugal imported 22.7 million litres of grain in the early 18th century. Fisher's figures, on the other hand, covering 1700-4, are made comparable to these by increasing them by a factor of 1.4, which is the ratio between total grain and total wheat shipped into Portugal according to Francis' (1960) import data. This adjustment produces a yearly average of 16.8 million litres for all grain landed in Portugal in the early eighteenth century. Hanson's (1981) and Rau's (1954) estimates for the late 17th century were respectively 12.4 and 19.3 million litres of grain.

¹⁶ Of use to us here, the *Balanças Comerciais da Nação Portuguesa* were produced by the Portuguese state in the following years: 1776, 1777, 1783, 1789, 1796 to 1807 in Arquivo do Histórico do Ministério das Obras Públicas (Lisbon) In 1776, the quantity shipped was 146,532 *almudes*, which, in the metric system, converts into 2.5 million litres and was worth 8.5 tons of silver.

A.6 1800

The value and volume of wine exports are again from Martins (1990) for this year. The volume is 23 million litres and its value comes to 128.5 tons of silver.

The figure for the export of olive oil is the average of the amounts drawn from the Balanças Comerciais for three years – 1796, 1797 and 1799. They include sales to foreign countries, the colonies (mainly Brazil) and the islands of Madeira and the Azores. In volume, this comes to 1.3 million litres, which are valued at the 1800 price of 6.5 grams of silver per litre, thus representing a total of 8.3 tons of silver.

The amount of grain imported into the country is from Serrão (2005) and is averaged over the interval 1796-1810. It comes to 89.0 million litres per year. The annual value of grain exports at this time was 151.6 tons of silver.

A.7 1850

This is the only benchmark relative to which we have data for total values of agricultural exports and imports in reais, without need for volumes (Fontoura and Valério 2001). The shares of the respective values of wine, olive oil and grain in either total exports or imports are obtainable from Lains (1995). They can be converted into reais and then into tons of silver. The corresponding volumes can be derived using current prices.¹⁷

Wine exports represented 44.7 per cent of the value of total exports, in other words 4,246.5 million reais, the equivalent to 115.2 tons of silver. In volume this corresponded to 64.0 million litres.

On the other hand, olive oil exports were 4.1 per cent of the value of total exports, that is, 380 million reais, or 10.3 tons of silver. In volume, at current prices, this amounted to 1.3 million litres.

Grain imports for this benchmark was 3.9 per cent of total imports by value and reached a value of 10 tons of silver, or 370 million reais. Using current prices, we infer that this would have represented a volume of 9.1 million litres.

¹⁷ All figures representing this benchmark are obtained by averaging data for the decades 1840-9 and 1850-9.

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